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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER	
DSOUZA, JOSEPH FRANCIS A	
ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/691,084	PARK ET AL.	
	Examiner	Art Unit	
	Adolf DSouza	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1,5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US Pub 2003/0063558) in view of McFarland et al. (US 6,628,673) and further in view of Khan et. al (US 5,646,632).

2. Regarding claim 1 Kim teaches a method for compensating for phase distortions in a base station of an OFDMA (orthogonal frequency division multiple access) based cellular system, comprising:

(a) receiving OFDM (orthogonal frequency division multiplexing) symbols from a plurality of mobile stations, canceling a symbol guard interval using a reference timing signal, and performing an FFT (fast Fourier transform) process on the OFDM symbols (Paragraph 36 Lines 1-5, Paragraph 5 Lines 6-9, and Paragraph 50 Lines 3-4);

(c) restoring phases of the OFDM symbols divided into subchannel groups (Paragraph 52 Lines 6-8); and

(d) performing channel estimation and equalization on the restored OFDM symbols for each mobile station to thereby perform a demodulation process (Paragraph 29 Lines 1-8 and Paragraph 31 Lines 4-6).

Kim does not teach: (a) the reference timing signal being established based on an estimation of relative delay times among mobile stations (b) dividing the OFDM symbols that have undergone FFT processing into sub channel groups of the mobile stations.

However Khan teaches:

(a) the reference timing signal being established based on an estimation of relative delay times among mobile stations (Fig. 2, element 215; column 2, lines 39 – 60; column 3, lines 29 – 47). What Khan disclose is the relative timing established based on the relative delay times between the base stations. One of ordinary skill in the art can easily use the same procedure for establishing the relative timing based on relative times between mobile stations. Once the relative delay times are determined, and the reference timing signal determined then the phase restoration of the OFDM symbols would automatically make use of the reference timing generated, making the phase restoration dependent on the reference timing.

Therefore, it would obvious to one of ordinary skill in the art to use the relative timing determination procedure of Khan in the system of Kim since this would allow the location of the mobile station (or base station as disclosed by Khan) to be determined.

However McFarland et al. teaches:

(b) dividing the OFDM symbols that have undergone FFT processing into subchannel groups of the mobile stations (Column 9 Lines 48-53).

It is advantageous to divide OFDM symbols into subchannel groups. Grouping OFDM subchannels based on their delay times results in a method with simpler and less computations (See McFarland et al., Column 5 Lines 4-8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to divide the OFDM symbols of Kim's method into subchannel groups, as McFarland et al. teaches, in order to result in a method with simpler and less computations.

Regarding claim 5, Kim teaches the method of claim 1, wherein in (c), the phase distorted OFDM symbols of the mobile stations are restored by a relative delay time calculated based on a difference between a delay time of the base station and a reference time resulting from the reference timing signal (Paragraph 16 Lines 3-7 and Paragraph 30 Lines 1-4, wherein, the delay time of one of the 'two input complex signals' is interpreted as the delay time of the base station, and the delay time of the second of the 'two input complex signals' is interpreted as that for a reference time resulting from the reference timing signal).

Regarding claim 6, Kim teaches the method of claim 1, wherein (d) comprises performing channel estimation and equalization to reduce residual distortions (Paragraph 29 Lines 1-8 and Paragraph 31 Lines 4-6).

Claims 1-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et al. (US Pub 2004/0076239) in view of McFarland et al. (US 6,628,673) and further in view of Khan et. al (US 5,646,632).

Regarding claim 1 Yu et al. teaches a method for compensating for phase distortions in a base station of an OFDMA (orthogonal frequency division multiple access) based cellular system, comprising:

(a) receiving OFDM (orthogonal frequency division multiplexing) symbols from a plurality of mobile stations, canceling a symbol guard interval using a reference timing signal, and performing an FFT (fast Fourier transform) process on the OFDM symbols (Paragraph 29 Lines 1-5 and Paragraph 27 Lines 1-3, wherein, as disclosed by applicant in the specification, the CP is interpreted as the symbol guard interval);

(c) restoring phases of the OFDM symbols divided into sub channel groups (Paragraph 27 Lines 3-17); and

(d) performing channel estimation and equalization on the restored OFDM symbols for each mobile station to thereby perform a demodulation process (Paragraph 27 Lines 7-12).

Yu et al. does not teach: (a) the reference timing signal being established based on an estimation of relative delay times among mobile stations (b) dividing the OFDM symbols that have undergone FFT processing into sub channel groups of the mobile stations.

However Khan teaches:

(a) the reference timing signal being established based on an estimation of relative delay times among mobile stations (Fig. 2, element 215; column 2, lines 39 – 60; column 3, lines 29 – 47). What Khan disclose is the relative timing established based on the relative delay times between the base stations. One of ordinary skill in the art can easily use the same procedure for establishing the relative timing based on relative times between mobile stations. Once the relative delay times are determined, and the reference timing signal determined then the phase restoration of the OFDM symbols would automatically make use of the reference timing generated, making the phase restoration dependent on the reference timing.

Therefore, it would obvious to one of ordinary skill in the art to use the relative timing determination procedure of Khan in the system of Kim since this would allow the location of the mobile station (or base station as disclosed by Khan) to be determined.

However McFarland et al. teaches:

(b) dividing the OFDM symbols that have undergone FFT processing into subchannel groups of the mobile stations (Column 9 Lines 48-53).

It is advantageous to divide OFDM symbols into subchannel groups. Grouping OFDM subchannels based on their delay times results in a method with simpler and less computations (See McFarland et al., Column 5 Lines 4-8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

divide the OFDM symbols of Yu et al.'s method into subchannel groups, as McFarland et al. teaches, in order to result in a method with simpler and less computations.

2) Regarding claim 2:

McFarland et al. teaches, wherein as to the reference timing signal, predetermined mobile stations with delay times shorter than a predetermined time are formed into a group, and the reference timing signal for decoding mobile station signals of this group is generated (Column 9 Lines 48-53).

As discussed in claim 1 above, it is advantageous that predetermined mobile stations with delay times shorter than a predetermined time are formed into a group, as that results in a method with simpler and less computations (See McFarland et al., Column 5 Lines 4-8).

3) Regarding claim 3:

Khan discloses the reference timing signal is obtained based on a delay time of the mobile station (see claim 1 above). Although Khan does not specifically teach, using the shortest delay within the group, such limitation is merely a matter of design choice and would have been obvious in the system of Yu et al. and McFarland et al.

Regarding claim 4: Yu et al. teaches the method of claim 1, wherein the FFT process in (a) is performed according to a reference symbol timing of the base station (Paragraph

27 Lines 13-17, wherein, the 'average phase' in interpreted as the reference symbol timing of the base station).

Regarding claim 6 Yu et also teaches the method of claim 1, wherein (d) comprises performing channel estimation and equalization to reduce residual distortions (Paragraph 27 Lines 3-12).

Regarding claim 7 Yu et al. discloses, in a device for compensating for phase distortions of OFDM symbols received from a plurality of mobile stations in a base station of an OFDMA (orthogonal frequency division multiple access) based cellular system, a phase distortion compensator in the base station of the OFDMA-based cellular system, comprising:

a symbol guard interval canceller for canceling a symbol guard interval of the OFDM symbols of the plurality of mobile stations received at the base station Page 6 Application/Control Number: 10/691,084 Page 7 Art Unit: 2611 (Paragraph 27 Lines 1-3, wherein, as disclosed by applicant in the specification, the CP is interpreted as the symbol guard interval);

an FFT (fast Fourier transform) processor for performing an FFT process on the OFDM symbols with the cancelled symbol guard interval (Paragraph 27 Lines 2-3);

a symbol timing estimator for estimating a time delay between a timing of each OFDM symbol received from the mobile station and a reference symbol timing of the base station (Paragraph 27 Lines 12-17, wherein, a phase is interpreted as a time delay);

a delay time phase compensator for compensating for phase distortions of the OFDM symbols of the mobile stations of the subchannels extracted by the subchannel group divider by using the delay time estimated by the symbol timing estimator (Paragraph 27 Lines 7-17);

and a channel estimation and equalizer for performing distortion correction of the OFDM symbols of the mobile Stations of the subchannels compensated by the delay time phase compensator, the distortion correction being performed according to an amplitude and a phase resulting from a signal channel of the mobile station (Paragraph 14 Lines 11-16).

All other limitations of claim 7 are as analyzed in claim 1 above.

Regarding claim 8 Yu et al. discloses the device of claim 7, wherein the symbol timing estimator further comprises:

a timing offset estimator for estimating a delay time of the mobile station with respect to a transmit symbol timing of the base station (Paragraph 27 Lines 12-17, wherein, a phase is interpreted as a delay time).

Yu et al. does not disclose a timing controller for grouping together the mobile stations according to the delay times of the mobile stations estimated by the timing offset estimator. However, as discussed in claim 1 above, McFarland et al. discloses, a timing controller for grouping together the mobile stations according to the delay times of the mobile stations estimated by the timing offset estimator (Column 9 Lines 48-53).

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Adolf DSouza
Examiner
Art Unit 2611

AD

DAVID C. PAYNE
SUPERVISORY PATENT EXAMINER